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ABSTRACT

Urban and rural small scale industry and employment generation in Sierra Leone, Africa were studied via a 2 phase procedure. Phase 1 data collection (March-June, 1974) involved a random sampling procedure based on locality size. The following information was obtained from each of the localities (cities, towns, and villages) and "enumeration areas" (200 families) surveyed: (1) type of activity; (2) number of workers, including the proprietor, hired workers, and apprentices; (3) type of workshop; (4) number and kind of machines used. Phase 1 results indicated Sierra Leone small scale industry was extensive both in terms of establishment number and employment. Establishments were found to be small (1.9 workers per industry) and predominantly rural (95 percent). Activity composition (tailoring, carpentry, gara dyeing, and baking) varied considerably by location, an indication of the importance of making distinctions between industries in urban and rural areas. Still in progress, Phase 2 involves enumeration twice weekly of a sample of 366 industrial establishment during a 1 year period (1974-1975) for purposes of determining key structural parameters of the rural small scale industrial sector and the intersectoral linkages uniting this sector with other parts of the economy, thereby identifying major determinants of the demand for labor in rural small scale industry. (JC)

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The Role of Small Scale Industry in Employment Generation and Rural Development: Initial Research Results from Sierra Leone

by

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THE AFRICAN RURAL EMPLOYMENT RESEARCH NETWORK

The African Rural Employment Research Network was inititated in 1971 by a group of scholars interested in comparative analysis of the development process in selected African countries with emphasis on rural employment problems. The research program has been jointly designed by scholars in African countries, at Michigan State University and at other universities in North America. Research emphasis is being directed to Sierra Leone, Nigeria and Ethiopia. In addition, individual scholars in other countries, such as Ghana, Zaire and Tanzania, are carrying out research on rural employment problems and are members of the Network.

The research program emphasizes joint and individual studies of rural employment such as the demand for labor in alternative production systems and in the rural nonfarm sector, the migration process as a link between rural and urban labor markets and the impact of macro-economic policies on labor absorption in agriculture. Attention will be directed to developing policy models to trace the consequences of alternative strategies of agricultural development on farm output, employment, income distribution and migration and to incorporating the employment objective into project, sub-sector and sectoral analysis in developing countries.

The Network maintains links with similar research networks in Latin America (ECIEL) and Asia (CAMS) and with organizations such as the FAO, ILO and the World Bank.

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THE ROLE OF SMALL SCALE INDUSTRY IN EMPLOYMENT GENERATION AND RURAL DEVELOPMENT: INITIAL RESEARCH RESULTS FROM SIERRA LEONE***

by

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ABSTRACT

The primary objectives of this paper are to report the initial results and to summarize the current status of the small scale industry research being undertaken in Sierra Leone as a component of the African Rural Employment Project. The empirical evidence generated during the initial phase of this study has revealed that the small scale industrial sector in Sierra Leone is extensive, both in terms of the number of establishments and employment. The average size of these establishments is small, 1.9 workers per establishment and the vast majority (95 percent) are located in the rural areas. Tailoring is by far the most important activity, followed by carpentry, gara dyeing and baking. The composition of activities varies importantly by location, thus reinforcing the importance of distinguishing between industries in the urban and rural areas. Moreover, these initial results illustrated the importance of including rural small scale industry in employment generation and rural development programs.

To obtain even more detailed information on the sector, however, a sample of 366 industrial establishments is being enumerated twice weekly for a period of one year. The data generated will be subjected to various statistical analyses to determine the key structural parameters of the rural small scale industrial sector and the intersectoral linkages that unite this sector with the other parts of the economy. As a result, the major determinants of the demand for labor in rural small scale industry will be identified and examined. The results generated by the study should thus prove to be of value to policy-makers charged with developing effective strategies and policies for employment generation and rural development in Sierra Leone as well as other African countries.

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PREFACE

This paper is a progress report on a study of small scale industry and employment generation in both urban and rural areas in Sierra Leone. The study should be of value to (a) researchers interested in the methodology of conducting research on small scale industry in rural areas, (b) policy makers in Sierra Leone and other African countries and (c) donor agencies.

The paper outlines the theoretical framework which guides the research and the methodology for analyzing small scale industry as one component of an integrated research program which is being carried out under the direction of Dr. Dunstan S. C. Spencer. The results of the first phase of the small scale industry study reveal that small scale industry in rural Sierra Leone has been substantially underestimated by previous government surveys. The Chuta/Liedholm data reveal that almost 95 percent of the industrial establishments in Sierra Leone are located in rural areas and that these rural establishments employ 86 percent of the employment in the industrial sector.

The second phase of the research on small scale industry includes the collection of detailed data from 366 industrial establishments throughout Sierra Leone over a twelve month period--July 1974 through June 1975. The firms were interviewed twice a week over the twelve month period. The results of these studies will be analyzed by Messrs. Chuta and Liedholm over the coming year and published in mid-1976.

Copies of the questionnaires and further information can be obtained by writing to the authors at Michigan State University.

Carl K. Eicher, Director
African Rural Employment Research Network

The primary objectives of this paper are to report the initial results and to summarize the current status of the small scale industry research being undertaken in Sierra Leone as a component of the African Rural Employment Project. The problem setting will be discussed first, followed by a description of the scope of the small scale industry research effort. The initial results from phase I of this research, the phase designed to obtain a point estimate of the population of Sierra Leone's small scale industrial establishments, will then be presented. There will next follow a discussion of the current status of phase II, which is designed to provide more detailed information on a selected sample of these establishments over an entire year. The methods that are to be used to analyze these data will then be outlined. A final section will examine the policy relevance of the study.

Problem Setting

African governments have recently become increasingly aware of and concerned with needs to design effective strategies and policies for developing their small scale industrial establishments. There has also been a growing recognition that small scale industries are not just an urban phenomenon, but are an important component of rural development programs as well (Liedholm [1973].

In Sierra Leone, the growth in the Government's interest in small scale industry paralleled the increasing disenchantment with the import substitution industrial strategy that the country had been pursuing since

Independence. The import substitution strategy was largely designed to foster the development of large scale, urban-based, foreign-owned firms in the country, but the results obtained were disappointing.

An examination of Sierra Leone's industrial statistics reveals the limited success of this policy. Although the Sierra Leone economy as a whole grew at a compound annual real rate of 2.8 percent during the period from 1965/66 until 1971/72, the manufacturing sector grew at a compound real rate of only 1.1 percent per year.[1/] Moreover, even though the real output of the "large scale" manufacturing enterprises did increase during this period, the number employed by these "large scale" manufacturing firms actually declined at a compound annual rate of 3.5 percent.[2/] Finally, the real output of the "small scale" manufacturing firms declined at an annual rate of 1.6 percent during this same period.[3/]

While the Government was pursuing this import substitution strategy, it did relatively little to encourage or promote small scale industrial firms. Indeed, except for reserving a few manufacturing activities to citizens and for making some minor provisions for financing, the Government

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[1/] Computed from data in Government of Sierra Leone [1973, p. 10].

[2/] Computed from data supplied to the Banks of Sierra Leone by the Ministry of Labour (Bank of Sierra Leone [1972, Table 33]). "Large scale" as defined by both the Ministry of Labour and the Central Office of Statistics refers to firms employing six or more persons. However, firms included in the Ministry of Labour's statistics were not necessarily the same as those included in the Central Office of Statistics' data and thus the employment and output figures are not necessarily strictly comparable. Similar results of declining employment combined with increasing manufacturing output, however, are reported to have occurred in other African countries that followed import substitution industrial policies (see Frank [1968]).

[3/] Computed from data in Government of Sierra Leone [1973, p. 31]. The real output statistics were calculated using the implicit price deflators for manufacturing and handicrafts derived by the Central Office of Statistics.

pursued essentially a policy of benign neglect with respect to small scale establishments.[4/] The Government, however, offered substantial subsidies and concessions to large scale firms and thus, in effect, penalized the smaller firms and made it relatively more difficult for them to compete effectively. The 1960 Development Ordinance, for example, was designed to attract large scale establishments to the country by offering these firms substantial tax concessions (Government of Sierra Leone [1971, p. 1]). One of these tax concessions enabled the large firms to reduce or waive the import duty on their raw materials for a specific period. By not permitting the smaller firms to qualify for a similar exemption, the smaller firms faced higher relative prices for their raw materials and, thus, were correspondingly accorded a smaller amount of effective tariff protection than were the large firms.[5/] Another example of a policy that discriminated against small scale industry was the Government's decision to establish near Freetown an industrial estate in which the subsidized facilities were to be made available only to large scale establishments.

The Government of Sierra Leone, however, began to reassess its industrialization strategy in the early 1970's. One of the first indications of

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[4/] In 1969, a Non-Citizens Act was passed which debarred foreigners from the manufacture of cement blocks, wooden and metal furniture, doors and windows, bakery goods and mineral waters. In the financial area, a Development of Industries Board was established in 1949 to serve the credit needs of wholly-owned African enterprises. The scheme was understaffed and operated on a modest scale. Indeed, over a sixteen year period, only forty-four loans were made to small scale manufacturing firms, and the default rate was extremely high. Finally, it should be noted that in 1961 a Small Scale Industries Division was established within the Ministry of Trade and Industry, but is operated with a very small staff and budget.

[5/] In 1974, for example, the dyes used as inputs by the small scale gara dyeing industry were subject to a 36.5 percent duty while the duty on the sewing machines used by the tailors was 15 percent (Government of Sierra Leone [1967] and updated by the Economic Planning Unit).

official rethinking was provided in the Minister of Finance's 1972 Budget Speech, in which the Minister declared:

> Hitherto our industrial policy has been based on the strategy of import substitution. Our experience over the past ten or more years, however, has shown that import substitution by itself is a limited and insufficient strategy for industrial development (Government of Sierra Leone [1972, p. 5].

The details of what was to become Sierra Leone's new industrial strategy were fully articulated in the National Development Plan (Government of Sierra Leone [1974]). This strategy implied that priority would be given to the following types of industries:

(1) agro-based industries and others based on natural resources;

(2) labour-intensive industries; and

(3) industries which aid expansion of exports and development of the traditional agricultural sector (Government of Sierra Leone [1974, p. 175].

In view of these new industrial sector priorities, small scale industries, particularly those located in rural areas, were now to play an important role in the Sierra Leone's development effort. As the National Development Plan notes:

> The development of small industries and handicrafts is particularly important at the present stage of development of the economy. It will contribute to:
>
> (1) employment generation and relief of urban unemployment and rural underemployment, since the sub-sector is highly labour-intensive;
>
> (2) skill formation and development of entrepreneurship;

(3) foreign-exchange earnings through savings on imports and increase in exports, particularly of handicrafts and agro-based products;

(4) socially desirable redistributive effects through raising the income of the poorest sections of the community; and

(5) rural and regional development (Government of Sierra Leone [1974, p. 185]).

To foster and encourage small scale industry in Sierra Leone, the National Development Plan envisaged that a rather general development program would be undertaken. Primary attention was to be focused on measures designed to assist directly the small scale enterprises such as through the provision of expanded training, extension, marketing, and credit facilities. Except for the Credit Guarantee Scheme, under which the Bank of Sierra Leone would guarantee loans made by commercial banks and the National Development Bank to small private sector establishments, however, the detailed components of the overall program were not specified and needed to be further developed.[6/]

In addition to assessing and developing further the various direct measures to promote small scale industries, however, the Government will need to ascertain the effectiveness of various indirect methods that might also be used for this purpose. More specifically, the Government will need to assess the effects of alternative agricultural, tax, pricing and monetary policies on the performance of the small scale industrial sector. It will be important for the Government to understand, for example, how variations in factor prices affect the substitution of labor for capital

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[6/] The Credit Guarantee Scheme was launched on January 1, 1974 and during the first year 155 loans amounting to Le. 520,000 [1 Le. (Leone) = $1.20 U.S.] were guaranteed. Only 7 of the guaranteed loans, however, were for industrial activities. These data were supplied by officials of the Bank of Sierra Leone.

by these firms. Moreover, the Government will need to determine how the provision of expanded transport and public utility services will influence the small scale industrial sector, particularly that portion located in the rural areas.

At the present time, however, the data required to ascertain what direct and indirect measures will be most effective for promoting the development of small scale industries in Sierra Leone do not exist. The only statistics relating to the industrial sector are for "large scale" firms and even these data are incomplete.[7/] There are no data on small scale industries in either the urban or rural areas and no studies, even on a sample basis, of the entrepreneurs themselves.

The statisical deficiency, however, was explicitly recognized in the National Development Plan. Indeed, the Plan stressed that, "an immediate developmental task relating to the [small scale industry] sub-sector is to conduct an economic survey to assemble data on its size, composition, structure of inputs and outputs, development problems, and potential. The survey is essential for evolving a detailed development programme" (Government of Sierra Leone [1974, p. 185]). Fortunately, the small scale industry component of the African Rural Employment Project will be able to generate these required data and will thus be filling a clearly articulated need of the Government of Sierra Leone

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[7/] The terms "large scale" and "small scale" are not consistently defined in Sierra Leone. The Ministry of Labor and the National Accounts Divisions of the Central Statistics Office, for example, define "large" firms as those establishments employing six or more persons. In its 1966/67 Census of Establishments (Government of Sierra Leone [1970]), however, the Central Statistics Office defined "large" firms as those establishments with an annual gross income of Le. 5,000 or more. Finally, the Central Planning Unit (Government of Sierra Leone [1974, p. 173]) defined a "medium" or "large" firm as an establishment that met at least two of the following minimum criteria: (a) capital Le. 50,000; (b) annual output: Le. 100,000; and (c) eleven people employed.

Research Scope

The primary focus of this research effort is on rural small scale industries in Sierra Leone. Since the phrase "rural small scale industry" is subject to some ambiguity, however, the individual terms in the phrase must be defined before proceeding.

The term "industry", for example, is vague and is sometimes applied to a wide range of activities. In the present study, however, the term "industry" refers to those establishments that specifically engage in the production and repair of "manufactured goods".[8/] Thus, mining, construction, trading, transport, financial, social and personal services (except for repairing) are excluded from the present study. The activities included in the present definition, however, generate the largest amount of nonfarm employment within the rural nonfarm sector. The next most important rural nonfarm activity, apart from mining, is trading, a subject that will be examined in a separate study.[9/] Finally, it should be noted that the agricultural processing activities, particularly the processing of rice and palm oil, are also not included in the present paper, but will be analyzed in a separate processing study.

Another ambiguous term that must be defined is "small scale". Since a complete spectrum of firm sizes exists in any country, any definition

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[8/] The definition is consistent with virtually every study of small scale industry in Africa (see Liedholm [1973, pp. 6-8]). Specifically, the activities included under categories 3000 and 9510 of the new ISIC classifications are included in the analysis (or categories 200-300 under the old ISIC scheme).

[9/] In preliminary data collected in rural localities during phase I, "industry" accounted for 62 percent of rural nonfarm employment and "trading establishments" accounted for 35 percent (not including mining or government).

creates a rather arbitrary dividing line between firms. The measure most commonly used is the number of employees, but the dividing line chosen varys from country to country and extends from 5 to 500 employees.[10] For the purpose of the present study, however, "small scale" has been defined to include those establishments employing less than 50 persons. This criterion was chosen because it appeared to provide a good dividing line between the indigenous and foreign-owned firms and because it would facilitate comparison with studies in Nigeria, where 50 employees is also the dividing line between large and small. Nevertheless, since important variations in firm characteristics seemed to occur even within the range defined as "small scale", additional size divisions of firms were made within the small scale classification and were used wherever possible.[11]

Finally, it is necessary to provide a working definition of "rural". As with size classifications, the distinction between rural and urban is arbitrary and may create an artificial grouping of firms. Moreover, the definitions of rural and urban areas vary widely from country to country.[12] For reasons of simplicity and comparability with Nigeria, however, the present study has adopted the standard dividing line of rural and urban used by the United Nations, 20,000 inhabitants.[13] Since the composition of

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[10] For a discussion of the various definitions, see Staley and Morse [1965, p. 14] and Schadler [1968, p. 42]. Staley, for example, defines 1-9 as "very small" and 10-99 as "small".

[11] Indeed, the following divisions were used: 1, 2-5, 6-9, 10-49 and 50+ employees.

[12] In Ghana, the threshold size for an urban area is 5,000 inhabitants, while in Kenya and Nigeria the figures are 2,000 and 20,000 respectively (Rosser [1973, p. 11]).

[13] Ideally, a rural-urban classification scheme based on the occupational structure, as well as population density, would be desirable; but unfortunately, the required data do not exist.

small scale industry seemed to vary within the rural and urban classifications, however, further classifications by locality size were used.[14/] Finally, it should be noted that although the main focus of the present study is on "rural" small scale industry, small scale industries in the "urban" area are also being investigated. The reasons for including urban industries within the purview of this study is that data on Sierra Leone's urban small scale industry do not exist and such data are needed to ascertain the differences between and the linkages with the small scale industries in the "rural areas". With these definitions specified, it is now possible to discuss phase I of the project.

[14/] The following classifications were used: enumeration areas; 2,000-5,000; 5,000-20,000; 20,000-400,000; over 100,000.

Procedure for Phase I Data Collection

In view of the paucity of data on rural small scale industry in Sierra Leone, the first task of the project was to generate the required statistics relating to this sector. In phase I of the data collection, a census of Sierra Leone's small scale industrial sector was undertaken to provide an estimate of the population of small scale industrial establishments in the entire country. Such an endeavor was unique because it represented one of the first attempts in Africa to estimate the total number of industrial enterprises in both the rural and urban areas of one country.[15/] In view of budgetary and time limitations, however, it was not possible to undertake a complete enumeration of every industrial establishment in Sierra Leone. Thus, it was necessary to devise a stratified sampling procedure to obtain an estimate of the establishment population. Since previous empirical studies have revealed that both magnitude and composition of industrial activity varies with size of settlements,[16/] the stratification was based on locality size.

The following procedure was thus used to obtain an estimate of the total number of industrial establishments. First, a total establishment enumeration was undertaken in the 18 localities, including Freetown, with populations in excess of 5,000.[17/] Secondly, one-half of the 24 localities

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[15/] The only comparable survey was the study of small scale industries in Ghana undertaken in 1963 (Ghana [1965]). In Nigeria, the Industrial Research Unit of the University of Ife (Industrial Research Unit [1972]) has undertaken establishment enumeration in several states, but does not estimate establishments in smaller villages (below 2,000). For a description of other partial surveys, see Liedholm [1973, p. 6].

[16/] See Liedholm [1973, p. 4].

[17/] The 1963 population census of Sierra Leone used the term "locality" to refer to cities, towns and villages (see map, Figure 1, on page 27).

with 2,000-5,000 inhabitants were randomly selected for total establishment enumeration.[18] Finally, it was necessary to obtain an estimate of the number of industrial establishments in the smallest census units, the "enumeration areas".[19] To ensure consistency with the other micro-level components of the Sierra Leone research project, the twenty-four rural "enumeration areas" selected for these studies were used for the small scale industrial component as well. Thus, a total count was made of every industrial establishment operating in these twenty-four enumeration areas.

In each of the localities and "enumeration areas" examined during phase I, the enumerators obtained the following information about each establishment:

(a) the type of activity,

(b) the number of workers, including the proprietor, hired workers and apprentices,

(c) the type of workshop (whether temporary, mud or cement) and

(d) the number and kind of machines used (whether power driven or manually powered).

These data were rather quickly obtained during the street-by-street enumeration undertaken in each of the selected localities and "enumeration areas". Fortunately, excellent cooperation was obtained from the local authorities in these areas, and, in most cases, they provided the enumerators with local personnel who assisted in locating the various establishments. Indeed, since

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[18] The only constraint imposed on the random selection procedure was that at least one locality had to be selected from each of the eight agricultural regions that were used as the sampling frame for choosing the "enumeration areas". This procedure was designed to ensure that localities representing all types of agricultural production conditions were included.

[19] Each "enumeration area", which was an artificial grouping constructed by the Central Statistical Office for the 1963 population census, contains an estimated 200 families (Spencer [1972, p. 8]).

most of the industrial establishments did not have signs and were often hidden behind other buildings, these local informants were vital in ensuring that an accurate enumeration of firms was obtained.

Finally, it should be noted that the phase I data were collected during the period from March to June 1974--a period during which one might have expected a sizeable variation in the level of nonfarm activity. This variation would have been expected because the "wet" season in Sierra Leone normally begins in early May, at which time nonfarm activity would be hypothesized to decline as a result of the marked increase in the demand for farm labor for planting. Fortunately, for the present study, the "wet" season in 1974 did not begin until the end of June, and thus the results of the phase I survey should provide a good estimate of the population of rural small scale industrial establishments during a period when they would be expected to be reasonably active.

Initial Results of Phase I Data Collection

With the phase I data collection now completed, it is now possible to summarize the salient findings. The number and size distribution of establishments by location will be examined first, followed by an examination of the categories of industrial activities and the composition of the factors of production used by these establishments.

One of the important findings of the phase I research is the discovery that the industrial sector in Sierra Leone is much more extensive than had been previously recognized. This result is apparent from Table 1, which portrays the distribution of industrial establishments and industrial employment by location and size. These initial figures from the phase I surveys reveal that in 1974 almost 47,000 industrial establishments employed approximately 87,000 individuals. The Government of Sierra Leone, on the other hand, had assumed that only 52,000 individuals would be employed in this sector in 1974.[20/] Thus, the phase I survey indicates that their industrial employment estimate should have been increased by two-thirds.

The phase I surveys also reveal that the small scale industrial establishments dominated the industrial sector in terms of both the number of firms and total employment. As Table 1 indicates, for example, there were only 28 large scale establishments in Sierra Leone and those firms employed only 4,111 individuals.[21/] In those localities with populations in excess of 2,000, on the other hand, there were approximately 5,000

[20/] Government of Sierra Leone [1974, p. 27].

[21/] Data obtained from employment list of the Ministry of Labor for December 1973 and supplemented by data on eight large scale firms not included on this list. Large scale refers to establishments employing fifty or more persons.

Table 1. Sierra Leone: Distribution of Industrial Establishments by Location and Size, 1974

Location and Firm Size	Number of Establishments	Percent	Employment	Percent
A. Small scale industry				
1. Rural enumeration areas[a/]	42,000	89.4	68,000	78.3
2. Localities with population from 2,000-4,999[b/]	1,614	3.4	3,784	4.4
3. Localities with population from 5,000-20,000	983	2.1	2,680	3.1
4. Localities with population from 20,000-100,000 (Bo, Kenema, Koidu)	960	2.0	3,321	3.8
5. Localities with population over 100,000 (Freetown)	1,391	3.0	4,903	5.7
Total small scale	46,948		82,688	
B. Large scale industry				
Total large scale	28	.1	4,111	4.7
Total large and small scale industry	46,976	100.0	86,799	100.0

[a/] Estimate based on projection from preliminary data received from 24 sample enumeration areas (see footnote 22). These data include those individuals who engaged in industrial activities on a part-time basis.

[b/] The actual establishments and employment figures obtained was doubled since only half the localities in this size range were examined.

Source: Small scale industry data collected during phase I of small scale industry component of African Rural Employment Project, Njala University College. Data for large scale were obtained from employment lists of the Ministry of Labor for December, 1973, supplemented by data collected by the authors.

small scale industries employing approximately 15,000 individuals (see Table 1). Moreover, on the basis of the returns from the 24 sample "enumeration areas", it was projected that there were approximately 42,000 small scale establishments employing 68,000 persons in all the rural "enumeration areas" of Sierra Leone.[22/] Thus, these results indicate that small scale establishments account for approximately 95 percent of employment in Sierra Leone's entire industrial sector.

Indeed, the data presented in Table 1 reveal that the average size of industrial establishments in Sierra Leone was quite small. The "average" industrial establishment in Sierra Leone, for example, employed only 1.9 workers.[23/] A closer examination of the data, however, revealed that the average size of industrial establishments was directly related to the firm's location. If only small scale industries were considered, for example, the "average" industrial establishment in the "enumeration areas" employed 1.6 persons, while in these rural localities with 2,000 to 5,000 inhabitants the "average" establishment employed 2.3 workers.[24/] Moreover, in Freetown, the largest urban locality, the "average" small scale industrial firm employed 3.5 workers.[25/]

[22/] These estimates were obtained by multiplying the actual number of industrial establishments and industrial employment in each "enumeration area" by a figure reflecting the representation of that "enumeration area" in that particular agricultural region. It should be further noted that included in these data are those individuals who engaged in industrial activities on a part-time basis. One goal of phase II of this study will be to analyze in detail those individuals who are engaged in both industrial and nonindustrial activities over the course of a year.

[23/] Computed from Table 1.

[24/] In those localities in excess of 2,000, the breakdown of establishment by firm size was as follows: 1,673 (33.8 percent) firms consisted of one person; 2,753 (55.6 percent) firms employed from 2-5 persons; 359 (7.2 percent) firms employed from 6-9 persons; 163 firms (3.3 percent) employed from 10-49 persons.

[25/] Kilby [1962, p. 8] reports that the "average" urban firm in Eastern Nigeria employed 2.7 workers, while Callaway [1967, p. 170] reports that the "average" firm in Ibadan employed 2.8 workers.

These results reinforce the importance of stratifying the analysis by size of locality and, indeed, provides support for distinguishing between "rural" and "urban" small scale industries. Although any division between rural and urban is, by nature, arbitrary, 20,000 inhabitants, as noted earlier, was adopted as the dividing line in the present study. On the basis of the 1963 population census, only Bo and Freetown would be classified as "urban". Discussions with government officials and the results of the establishment enumeration themselves, however, revealed that two other localities, Koidu and Kenema, had grown rapidly since 1963 and by 1974 must have had populations in excess of 20,000.[26/] Thus, in the present study, Koidu and Kenema have been classified as "urban" and have been grouped with Bo for purposes of analysis and stratification.

The data presented in Table 1 reveal, however, that even if Bo, Kenema and Koidu are classified as "urban", almost 95 percent of the industrial establishments are located in rural rather than in the urban localities. Moreover, these rural establishments account for 86 percent of the employment in the industrial sector. Thus, studies that fail to incorporate "rural" industrial establishments in their analyses are missing a most important component of economic activity.

Additional insights into the nature of Sierra Leone's small scale industrial sector can be obtained from an examination of the composition of industrial activities undertaken in the country. Since the detailed figures relating to the rural "enumeration areas" are still only preliminary estimates, however, the industrial structure of the "enumeration areas"

[26/] Bo, for example, which is estimated to have grown very little from its 1963 population of 26,613, had 273 individual establishments in 1974 while Kenema had 290 and Koidu had 428. All other localities outside of Freetown had less than 200 industrial establishments.

will be presented and discussed separately from the industrial structure found in those localities with populations in excess of 2,000.

A detailed breakdown of the estimated distribution of small scale establishments by industrial activity in the "enumeration areas" is presented in Table 2. The data reveal that tailoring is clearly the most important small scale industrial activity undertaken in the rural "enumeration areas" of Sierra Leone, as it accounted for 31 percent of the small scale establishments and 29 percent of the employment in these areas. Mat making, blacksmithing, carpentry and spinning were the next most important activities undertaken. Indeed, over 84 percent of the small scale establishments were estimated to be engaged in one of these five activities, thus revealing the rather concentrated nature of the industrial activity in the rural "enumeration areas".

A somewhat different structure of industrial activity, on the other hand, is found in those localities with populations in excess of 2,000. These differences are revealed in Table 3, which presents a detailed breakdown of the distribution of establishments by industrial categories and size of locality in those localities with 2,000 or more inhabitants. One of the most striking results presented in this table is the even more dominant position that tailoring assumes in these localities. Indeed, 55 percent of the establishments and 46 percent of the industrial employment in localities with more than 2,000 inhabitants are engaged in tailoring. Moreover, the data reveal that tailoring is ubiquitous in Sierra Leone, being predominant in both rural and urban areas. Studies of small scale industry in other African countries and elsewhere have revealed that tailoring is consistently the single most important small scale industrial

Table 2. Sierra Leone: Preliminary Estimate of the Distribution of Small Scale Establishments and Employment by Industrial Categories in Enumeration Areas, 1974

I.S.I.C.[a]		Total Number[b]		Percentage	
		Establishment	Employment	Establishment	Employment
31	Food				
3117	Baking	1,500	3,000	3.6	4.4
32	Textiles and wearing apparel				
3211A	Spinning and weaving	4,000	6,000	9.5	8.8
3214	Mat making	8,000	9,000	19.0	13.2
3220	Tailoring	13,000	20,000	31.0	29.4
3240	Shoe making and repair	1,000	1,000	2.4	1.5
33	Wood				
3319	Carving	500	1,500	1.2	2.2
3320	Carpentry	5,000	11,500	11.9	17.0
37-38	Metal				
3720	Goldsmithing	1,500	2,500	3.6	3.7
3811	Blacksmithing	5,500	11,500	13.1	17.0
3909	Others[c]	2,000	2,000	4.7	2.9
	Total	42,000	68,000	100.0	100.1

[a] International Standard Industrial Classification.

[b] Preliminary estimate based on projection from data obtained from the 24 sample "enumeration areas". The estimates were obtained by multiplying the actual number of industrial establishments and industrial employment in each "enumeration area" by figures reflecting the representation of that "enumeration area" in that particular agricultural region.

[c] Other industries includes hammock making, basket making, bicycle repair and watch repair.

Source: Small scale industry data collected during phase I of small scale industry component of African Rural Employment Project, Njala University College.

Table 3. Sierra Leone: Distribution of Small Scale Establishments and Employment in Localities Exceeding 2,000 by Industrial Categories and Size of Localities, [illegible]

I.S.I.C.[a]	Type of Activity	Localities 2,000-5,000		Localities 5,000-20,000		Localities 20,000-100,000 (Bo, Kenema, Koidu)		Localities Over 100,000 (Freetown)		Total		Percent of Total	
		Estab.	Empl.	Estab.	Empl.	Estab.	Empl.	Estab.	Empl.	Estab.	Empl.	Estab.	Empl.
31	Food												
3117	Baking	104	206	45	155	12	84	11	164	172	609	3.5	4.2
32	Textiles and wearing apparel												
3211A	Spinning and weaving	86	126	16	27	1	1	0	0	103	154	2.0	1.1
3211B	Gara dyeing	90	380	61	280	19	82	3	24	173	766	3.5	5.2
3220	Tailoring	782	1,508	546	1,290	567	1,522	816	2,380	2,711	6,700	54.8	45.6
3240	Shoe making and repair	16	18	22	35	23	36	81	131	142	220	2.9	1.5
33	Wood												
3319	Carving	24	76	5	23	3	14	3	4	35	117	0.7	0.8
3320	Carpentry	226	666	137	483	115	536	75	345	553	2,030	11.2	13.8
37-38	Metal												
3720	Goldsmithing	22	32	16	47	15	43	20	54	73	176	1.5	1.2
3811	Blacksmithing	74	180	32	70	10	39	12	37	128	326	2.6	2.2
3819	Welding and fitting	6	20	4	9	8	48	19	86	37	163	0.7	1.1
951	Repair services												
9512	Radio	10	12	8	17	18	41	20	61	56	131	1.1	0.9
9513	Vehicle	20	98	29	133	51	578	66	578	166	1,387	3.4	9.4
9514	Watch	10	16	18	26	25	36	56	76	109	154	2.2	1.1
3909	Others	144	446	44	85	93	261	209	963	490	1,755	9.9	11.9
	Total	1,614	3,784	983	2,680	960	3,321	1,391	4,903	4,948	14,688	100.0	100.0

[a] International Standard Industrial Classification.

Source: Data were collected during phase I of the small scale industry component of African Rural Employment Project, Njala University College.

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activity.[27] What is striking, however, about tailoring in Sierra Leone is the magnitude of the domination of this industry; indeed, in no other African country does tailoring appear to be as dominant as in Sierra Leone. Carpentry, in which 11 percent of the establishments are engaged, is the next most important activity in these localities, followed by gara (local cloth) dyeing (3.5 percent), baking (3.5 percent), vehicle repairs (3.4 percnet) and blacksmithing (2.6 percent).

These findings thus indicate that the composition of industrial activity varies with the size and location of settlements in Sierra Leone. The more "traditional" crafts, for example, such as mat making, weaving and blacksmithing are relatively much more important in the rural "enumeration areas" than in urban Freetown. The more "modern" activities, such as tailoring, vehicle repair, shoe making and metal welding, on the other hand, are relatively much more important in urban Freetown than in the rural "enumeration areas" or localities (see Tables 1 and 2). These results thus reinforce the importance of distinguishing between rural and urban small scale industries and point to the dangers of making predictions about rural industries on the basis of urban industrial surveys alone.

Finally, when the composition of small scale industrial activity in the localities of Sierra Leone is compared with that found in other countries, a few additional characteristics of Sierra Leone's small scale industrial sector emerge. Gara dyeing and baking, for example, are two

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[27] For a review of these studies, see Liedholm [1973, p. 8]. Typical examples of the position of tailoring are found in the studies of rural Western Nigeria (I.L.O. [1972, pp. 187-188]) and Eastern Nigeria (Kilby [1962, p. 6]) where tailoring is the number one activity and where 32 percent of the firms are engaged in this activity. The highest percentage found elsewhere known to the authors is urban Western Nigeria, where 51 percent of the firms engage in tailoring (Industrial Research Unit [1972, p. 41]).

activities, apart from tailoring, that are relatively much more important in Sierra Leone than elsewhere.[28] Shoe making and bicycle repairing, on the other hand, are relatively less important in Sierra Leone.[29] The complete explanation for Sierra Leone's particular structure of small scale industry, however, must await further study.

The phase I data also provide some insights into the composition of the factors of production employed by Sierra Leone's small scale industries. Since the factor data are not yet available for the establishments located in the rural "enumeration areas", however, the discussion, of necessity, must focus solely on those establishments in the various localities of Sierra Leone. The labor component will be discussed first, followed by a discussion of the capital component and the composition of capital and labor.

The labor used by the small scale entrepreneur consists of his own or family labor, paid employees and apprentices. In the small scale industrial establishments in Sierra Leone, the apprentices represent the largest component of the labor used by the firms in those localities with 2,000 or more inhabitants. Indeed, apprentices accounted for 42 percent of the labor used, while paid employees and proprietors accounted for 17 and 41 percent respectively. The use of apprentices in Sierra Leone appears to be somewhat less widespread, however, than in other African

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[28] Dyeing and baking generally represent less than 1 percent of the industrial establishments in most other countries. In Western Nigeria, for example, only .6 percent of the establishments were bakeries and .2 percent were dyers (Industrial Research Unit [1972, p. XIX]).

[29] Shoe making and repairing represented 6.4 percent of the establishments and bicycle repair represented 4.5 percent of the establishments in Eastern Nigeria (Kilby [1962, p. 6]).

countries. In rural Western Nigeria, for example, over 56 percent of the small scale industrial labor (including proprietors) consisted of apprentices (I.L.O. [1972, p. 87]). The reasons for the relatively smaller use of apprentices in Sierra Leone, particularly in view of the nonformal educational services it provides, must be further studied.

The relative importance of the use of apprentices, however, does vary markedly from industry to industry. The highest percentage of apprentices is found in such industries as vehicle repair (53 percent) and carpentry (58 percent), while correspondingly smaller percentages are found in such industries as tailoring (42 percent), blacksmithing (37 percent), gara dyeing (31 percent) and baking (17 percent). Finally, it should be noted that the use of apprentices varies by size of locality. In urban Freetown, for example, 45 percent of the labor used were apprentices while in rural localities with 2,000 to 5,000 inhabitants, the percentage declined to 36 percent. The rural-urban distinction once again thus proved to be important.

The amount of physical capital used by the small scale industrial establishments in Sierra Leone provided to be quite small. Data collected during phase I of the study reveal that 63 percent of the small scale establishments possessed at least one machine. The use of machinery was concentrated, however, in the tailoring industry, because virtually every establishment in that particular industry possessed at least one sewing machine. Since 55 percent of the industrial establishments were engaged in tailoring, it is clear that the use of machines elsewhere was indeed minimal. Moreover, the majority of machines used by this sector was manually powered. In those establishments in localities with 2,000 or

more inhabitants, 16 percent were power driven and 84 percent were manually powered.

Finally, it should be noted that the use of machines was less widespread in the rural than in the urban areas. In urban Freetown, for example, 57 percent of the establishments used machines while in those rural localities with 2,000 to 5,000 inhabitants only 48 percent of the establishments used machines. Indeed, it should be further noted that none of the establishments in these smaller rural localities used any power-driven machines. In these rural areas, it will thus be important to ascertain whether the lack of power is an effective constraint on an expansion of small scale industries.

One of the key questions from an economic point of view, however, is the efficiency with which these small scale industrial establishments combine the labor and capital inputs. At this time, only a minor fraction of the data necessary to answer this question is available. The data that do exist, however, indicate that the capital-labor ratio of the small scale industrial establishments in Sierra Leone is substantially below that of the larger establishments. Phase I data from the 89 small scale tailoring firms in Makeni, a rural locality, indicate that the capital-labor ratio for tailoring amounted to Le. 76 per worker.[30/] The corresponding figure for large scale establishments in Sierra Leone was Le. 5,813 per worker.[31/]

[30/] Computed by assigning a value of Le. 125 to each manually-powered sewing machine and a value of Le. 250 to each power-driven sewing machine and dividing by the number of workers. These were "average values" for such used machines in Sierra Leone.

[31/] Computed from data in Government of Sierra Leone [1970, p. 76]. The original value of machinery, equipment and vehicles for all large scale business establishments (defined by Central Statistics Office as those establishments with annual returns of Le. 5,000 or more) was divided by the number of persons engaged by these establishments.

These results indicate that the small scale industrial firms make intensive use of the apparent abundant factor, labor and less use of the apparent scare factor, capital. A more definitive assessment of the effectiveness with which the small scale industrial establishments used these resources, however, must await the more detailed data that are to be collected during phase II of this project.

Procedure for Phase II Data Collection

The purpose of phase II, which began August 1, 1974, was to generate more detailed information from a selected sample of small scale industrial establishments over a one year period. These data were required for the various statistical analyses that were to be undertaken to determine the key structural parameters of the small scale industrial sector and the intersectoral linkages that unite this sector with the other parts of the economy.

A two stage (cluster) sampling procedure was used in selecting the firms that were to be subjected to more detailed enumeration. The first stage involved choosing a sample of localities and "enumeration areas", while the second stage involved choosing a sample of establishments for more detailed enumeration from within these selected localities and "enumeration areas". This two stage sampling procedure was used because, by minimizing the enumerators' interviewing and transport time, it generated the maximum coverage of firms from the limited number of enumerators available for the study. In the following section, the sampling procedure used in the various rural and urban "localities" will be discussed first, followed by a discussion of the procedure used in the "enumeration areas".

The first task was to establish a criterion for selecting those localities in which the detailed establishment enumeration would be undertaken. In order to maintain and preserve the linkages between the various portions of the Sierra Leone study, the criterion adopted was to choose those localities that serviced the twenty-four random selected "enumeration areas". As a working definition, a locality was then defined to "service" an "enumeration area" if the inhabitants of the "enumeration area"

purchased any of their goods and services in that particular locality. On the basis of the preliminary returns from the rural consumption portion of the overall study, it was subsequently determined that the following thirteen localities serviced at least one enumeration area: three "urban" localities (Freetown, Bo, Kenema); three "rural" localities with populations from 5,000 to 20,000 (Makeni, Port Loko, Segbwema) and seven "rural" localities with populations from 2,000 to 5,000 (Rotifunk, Pendembu, Pujehun, Matru, Kabala, Kamakwie, Rokupr). Koidu was also added to the sample, however, because of the large number of small scale industrial establishments in that locality (see map, Figure 1).[32/]

To cover the establishments in these fourteen localities, eighteen enumerators were available on a half-time basis.[33/] Instead of adding four more localities, however, the four remaining enumerators were assigned to the four largest localities that serviced an enumeration area. Thus, Freetown, Bo, Kenema and Makeni were assigned two enumerators while the remaining localities were assigned one enumerator.

On the basis of the results obtained when the questionnaires were pretested, it was discovered that one full-time enumerator could interview

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[32/] The reason that Koidu serviced none of the "enumeration areas" was that no "enumeration areas" had been selected from the Kono District, in which Koidu is located. The reason Kono District had been excluded from the overall project was the concern that data collection would be difficult. There was no difficulty experienced, however, in obtaining data on industrial establishments.

[33/] The nine enumerators originally assigned to this study on a full-time basis were combined with the nine enumerators assigned to the marketing portion of the study so as to increase the coverage of localities that could be included in the analysis. Thus, nine full-time or eighteen half-time enumerators were available for the small scale industry portion of the study.

Figure 1. Sierra Leone: Phase II Localities

a total of thirty establishments per week.[34/] Thus, a total of 270 establishments could be interviewed in depth in these localities by the nine full-time equivalent enumerators assigned to the small scale industry study.

The next task was to establish criteria for selecting the particular establishments that would be enumerated in each of the fourteen selected localities. The sampling procedure, however, needed to satisfy two separate objectives. First, for the purpose of generalizing about the nature of the entire small scale industrial sector, it had to provide a reasonable representation of the underlying population of establishments in Sierra Leone. Secondly, it had to provide data on the complete spectrum of techniques of production utilized by the five small scale industries that were to be studied in greater depth.[35/] Since in some industries, only one firm was using a given technique of production, even a stratified sampling procedure would not satisfy both objectives. Thus, it was necessary to undertake two separate sampling exercises during the second stage of sampling.

To ensure that a portion of the firms selected in these localities would provide a reasonable "representation" of the underlying population of small scale industrial establishments in Sierra Leone, it was decided that two-thirds of the establishments chosen in each locality would be selected on a completely random basis. On this basis, 70 firms, representing 3 percent of industrial establishments in all the "urban" locali-

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[34/] Each enumerator could interview ten firms per day; since interviews were to be conducted twice weekly during a six day work week, thirty firms could be interviewed per week.

[35/] These industries are tailoring, carpentry, gara dyeing, baking and blacksmithing (accounting for over 80 percent of the employment in the rural localities of Sierra Leone).

ties, and 110 firms, representing 4 percent of the industrial establishments in all the "rural" localities of Sierra Leone, were randomly selected in the 10 "rural" localities. Fortunately, the characteristics of the 180 establishments selected in the random sample closely paralleled the underlying population of industrial establishments; thus, the random selection procedure did appear to produce a "representative sample" of the small scale industrial firms in Sierra Leone.

The remaining one-third of the establishments chosen in the fourteen localities, on the other hand, were selected on the basis of a more purposive sampling technique. The goal in this case was to obtain data reflecting the complete spectrum of techniques of production used in the most important rural small scale industries.

An examination of the phase I data and discussions with the Sierra Leone Government indicated that five rural industries were of sufficient importance to be studied in greater detail: tailoring, carpentry, gara dyeing, baking and blacksmithing.[36/] Tailoring, for example, dominated the rural industrial scene and was an activity in which extensive use was made of both electric and manually-powered machines. The next most important rural activity, carpentry, was also an industry in which the production techniques varied widely. The third industry to be studied in detail, gara dyeing, appeared to possess somewhat lower variation in production techniques than the other industries, but was an industry in which the Government was deeply interested. Baking, the fourth industry to be examined, was also an important rural industry and one that exhibited wide variations in the techniques of production. Finally, the blacksmithing

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[36/] These five industries accounted for over 80 percent of the employment in the rural localities of Sierra Leone (computed from Table 3).

industry was chosen for more careful study not only because of its exhibited varying production techniques, but also because of the industry's potential for producing agricultural tools. A purposive sample containing 90 establishments was then selected from among the firms in these five industries in a fashion to ensure that the sample would contain the complete range of production techniques. The two separate sampling exercise thus yielded a total of 270 establishments that were to be enumerated in those localities with populations in excess of 2,000.

The sampling procedure used in the "enumeration areas", on the other hand, was less complicated than that used in the localities. To preserve the linkages with the other portions of the overall Sierra Leone project, for example, it was decided to select the establishments from each of those twenty-four "enumeration areas" that had previously been selected for analysis on a random basis. Moreover, since preliminary data collected in the "enumeration areas" indicated that approximately one-sixth of the farming and nonfarming households were primarily engaged in industrial activities and twenty farm households were currently being examined in the farm level study, it was decided that four industrial establishments within each of these twenty-four "enumeration areas" should be randomly selected for more detailed examination during phase II. In this case, a random selection procedure alone was felt to provide an adequate representation of industrial activities in the "enumeration areas", because the phase I data revealed that there was very little variation in production techniques. Finally, it should be noted that the ninety-six industrial establishments selected for detailed examination in these "enumeration areas" were to be visited by the enumerators used in the farm level survey.

The data collected from the grand total of 366 industrial establishments that were to be enumerated during phase II were arranged on eight separate questionnaires. Three questionnaires were to be administered on a twice weekly basis, because the pretesting of the questionnaires had revealed that the proprietors rarely kept adequate records and that their recall of these particular flow items was short. A labor input questionnaire, for example, was designed to obtain information on the hours spent daily by the proprietor, family labor, hired labor and apprentices by sex in the industrial firm and elsewhere, as well as the wages paid in cash and in kind. In addition, an "other input" questionnaire was designed to obtain information on the daily quantity, value and source of inputs purchased by the firm. Finally, an "output" questionnaire was designed to obtain daily information on the quantity of output as well as quantity, value and destination of sales plus the proprietor's "other income". Once a month, on the other hand, a "financial questionnaire" was to be administered to yield data on the sources, quantities and value of borrowing and lending by the enterprise. Additionally, at the beginning and the end of the survey year, three inventory questionnaires were to be administered. These forms were designed to elicit information on: (1) the quantity and value of buildings, (2) the quantity, value and source of equipment (tools and machines) and (3) the quantity and value of the inventory of inputs and outputs. Finally, a detailed entrepreneurial questionnaire was to be administered once during the year to elicit various information including the entrepreneur's age, education, ethnic origin, previous occupation, parent's occupations, sources of initial and present capital, apprentice-

ship system, perceived barriers to expansion and management constraints.[37/] A preliminary analysis of some of the completed forms indicates that the quality of the data obtained from the firms is quite high.

[37/] Copies of all these forms are available from the authors.

Methods of Analysis

The various data collected during the phase II surveys will be subjected to statistical analyses suggested by the theoretical framework previously developed for the rural industrial study. Since this analytical framework has been outlined in an earlier paper (Liedholm [1973]), only those portions of the analysis focusing on the determinants of the demand for labor in rural small scale industries, a key objective of the project, will be discussed.[38/]

The demand for labor in rural small scale industries, is, of course, a derived demand and is thus related to the demand for the products of the rural industrial sector. The demand for these products, however, depends importantly on the farmers' income. To measure this relationship, it will thus be necessary to calculate the farmers' income elasticity of demand for rurally produced industrial goods. Fortunately, these can be estimated from the basic data currently being generated by the rural consumption component of the overall project.[39/] Another important source of demand for rurally produced industrial goods, however, is that arising from the backward and forward linkages with the agricultural sector. To ascertain these linkages, it will be necessary to have knowledge of the relevant a_{ij} coefficients of an input-output table constructed for Sierra Leone. Fortunately, the phase II surveys will provide the input and output data that are required

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[38/] A model focusing on the rural household as both a producing and consuming unit is currently being developed that will yield insights into the supply of labor for the sector. In addition, the migration components of the overall project will also deal with labor supply considerations.

[39/] An attempt will also be made to estimate the price elasticities of demand for these products. However, the price elasticities are difficult in practice to estimate and conclusive results may not be obtained.

for constructing the input-output coefficients for rural industries. The final important source of demand for rural industrial goods is that generated by the urban and import sector, parameters that in the present study will be considered exogenous and thus will be independently estimated.

These various output demands are subsequently transformed into a demand for labor through the production function. The specification and estimation of the production functions for rural small scale industry thus also becomes an important element in the analysis. In the present study, production functions with various specifications will thus be estimated empirically. The fixed coefficient Leontief production function, for example, is the production specification employed in input-output analyses. Since one of the goals of the overall project is to construct an input-output table for the entire rural sector of Sierra Leone, production functions with this specification must be estimated for the various rural industries if a complete table is to be constructed. A crucial element in the Leontief production function is the assumption that a single process production function exists in each industry; thus, the fixed labor coefficients can easily be computed from the labor and output data provided in the phase II surveys. Once the coefficients have been computed inversion of the Leontief matrix and appropriate multiplications will then enable one to determine how employment in rural industry would be affected by an autonomous change in the demand for either agricultural or rural industrial output.

The results obtained from the input-output analysis based on the fixed coefficient production function, however, are dependent upon the validity of the assumption underlying the formulation. In this particular case, the prior specification of a single process, fixed coefficient production func-

tion is of crucial importance, because the possibility of factor or process substitution is thereby assumed away. If such substitution is possible, however, then relative factor prices also play an important role in influencing the demand for labor.

The factor or process substitution issue, thus, is of considerable importance and, indeed, has been the subject of much discussion and debate. Fortunately, there are various methods available for empirically estimating the extent of substitution and these methods will be employed in the present study.

A linear programming framework, for example, can be used to analyze the extent of possible process substitution by firms. Thus, in the present study an attempt will be made to determine if alternative activity (or process) rays can be constructed and analyzed for each of the five most important rural industries in Sierra Leone. The relevant input, output and technical data to be used in the analysis will be generated from the detailed phase II survey of the tailoring, carpentry, gara dyeing, baking and blacksmithing industries.

In addition to the linear programming analysis of production, there are also the various neoclassical formulations of the production function, formulations that can provide insights into industrial production relationships in general and the factor substitution issue in particular. The neoclassical production function most commonly subjected to empirical estimation has been the Cobb-Douglas function. Since this function can be used to determine the returns to scale, as well as the marginal product of the factors of production, it can provide useful insights into the nature

of the industrial production relationship.[40/] Thus, the present study will use the labor, capital and value added data collected during phase II to estimate the parameters of Cobb-Douglas functions for each rural industry. Unfortunately, however, the Cobb-Douglas function, does not shed much light on the factor substitution issue, because one of its properties is that the elasticity of substitution (σ) is always equal to one.

Thus, it would also appear desirable to fit the more general Constant Elasticity of Substitution (C.E.S.) production function to these same industrial data. A key property of this function is that the elasticity of substitution (σ) can range from 0 to infinity, thus showing that both the Leontief fixed coefficient function, where $\sigma = 0$, and the Cobb-Douglas function, where $\sigma = 1$, are special cases of this more general function. Although several alternative procedures exist for estimating the parameters of this function, the following formulation appeared to yield the greatest insights for the purpose of this study:

$$\log L = a + b \log Q - c \log (W/p)$$

where L is labor, a is a constant, Q is value added and w/p is the real wage in the rural industry.[41/] The estimated parameters, b and c, provide valuable insights into the determinants of the demand for labor. The coeffi-

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[40/] The Cobb-Douglas is usually estimated in the following log linear form: $\log V = \log A + a \log K + b \log L$ where V represents value added, A is a constant, K is capital and L is labor. The parameters "a" and "b" are unconstrained and their sum can be used to determine the returns to scale. The marginal product of labor, which can be computed by suitable manipulation, would be of use in determining the shadow price of labor and in assessing the applicability of the marginality conditions.

[41/] For a discussion of the derivation of this formulation of the C.E.S. function, see Wallis [1973, pp. 56-57]. It should be noted that this formulation assumes that the profit maximizing and other marginal conditions hold.

cient, c, is a measure of the elasticity of substitution (σ) and thus reveals the degree to which factors can be substituted for one another in production. Moreover, as Minasian [1961] has noted ($-\sigma$), or -c, is the real wage elasticity of demand when output is held constant; thus, it indicates the percentage change in the demand for labor from a given percentage change in real wages. The coefficient b, on the other hand, is the elasticity of employment demand with respect to output when real wages are held constant; thus, this parameter measures the percentage change in demand for labor arising from a given percentage change in output.

The parameters of this production function, as well as the other functions, will be estimated with ordinary least squares techniques using the data generated during phase II. It is envisaged that cross section estimates of these functions will be derived for each of the rural small scale industries in Sierra Leone. Moreover, to ascertain if these functions vary seasonally, the production functions for several industries will be calculated using data grouped by quarters. Finally, to discover if the industrial production functions vary by location, separate production functions will be estimated for several industries grouped by location.

The previously described analyses, however, do not fully capture the important role played by the entrepreneur in the employment decision. The factors that determine the quantity and quality of entrepreneurial services that will be forthcoming in the rural small scale industrial sector, for example, will indirectly affect the demand for labor in that sector. By using the data collected from the entrepreneurial questionnaire of phase II, however, it should be possible to test some hypotheses concerning the factors that might be expected to affect entrepreneurial services. One might hypothesize, for example, that the lack of technical or managerial

skills has an adverse effect on the quantity and quality of entrepreneurial performance. This hypothesis might then be verified by using Chi-square tests to ascertain if there were a correlation between the profit rate or the size of firm (proxies for success) and such categorical variables as the entrepreneur's education and training, previous occupation and accounting system. Similarly to attempt to ascertain whether or not the lack of access to capital had an effect on entrepreneurial performance, one might, for example, seek to determine if there were a relationship between the profit rates of firms in a particular small scale industry and the firms' initial levels of capital. If firms which started out with less initial capital were as "successful" as those firms with more initial capital, for example, it would provide some indication that the "shortage of capital" might not be a particularly serious entrepreneurial constraint. These examples, however, are simply illustrative of the types of analyses that will be undertaken to examine the factors, including those of a social and cultural nature, that might influence the quantity and quality of entrepreneurial services. When these results, as well as those from all the other previously described analyses are obtained, they should provide significant insights into the major determinants of the demand for labor in the rural industrial sector of Sierra Leone.

Policy Relevance

The results generated by this study of rural small scale industry should thus prove to be of value to policy-makers in Sierra Leone and, indeed, in other African countries. They will provide, not only a descriptive profile of the scope and character of a relatively unknown component of the rural economy, but also a means of determining some of the employment effects of policies that are designed to influence either directly or indirectly the rural small scale industrial sector.

The effects of various wage policies on employment in the rural small scale industrial sector, for example, can be traced by using one of the statistical parameters obtained when estimating the C.E.S. production functions for these industries. Specifically, the estimate of the elasticity of substitution coefficient (σ) for each industry will provide an approximate measure of the percentage change in employment resulting from a given percentage change in the real wage.[42/] Thus, if there were indeed factor market distortions that resulted in an unduly high relative labor price, the policy-makers could use these coefficients to estimate the extra employment in the rural small scale industrial sector that would be generated through their removal. Correspondingly, these coefficients could also be used to estimate the employment consequences of failing to restrain real wage increases.

The statistical parameters generated in this study will also assist policy-makers in measuring how alternative agricultural policies might differentially affect employment in rural small scale industries. An

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[42/] See footnote "41", page 36. More precisely, it is the negative value of this coefficient that is relevant.

agricultural policy, for example, that increased the income of a large number of low income farmers, who might be hypothesized to possess a relatively high income elasticity of demand for rurally-produced industrial goods, might generate more rural industrial employment than an agricultural policy that benefitted only a smaller number of high income farmers, who might be hypothesized to possess a high income elasticity of demand for imported goods. By combining the estimates of these various agricultural groups' income elasticities of demand for rurally-produced industrial goods (estimates derived from the rural consumption study) with the estimates of the input-output coefficients between agriculture and rural industry and the production function estimates for the various rural industries, the differential and employment effects of these alternative policies can be measured and thus be incorporated into the policy-maker's decision framework.

In addition to providing a measure of the effects of these more indirect policies, however, the results of the study can provide policy-makers with insights on the effectivenesss of those policy measures that are directly designed to influence employment in the rural small scale industrial sector. The majority of the information useful for this purpose will be derived from the previously described analyses of entrepreneurial performance. The results of the analysis of the importance of technical and managerial skills in determining entrepreneurial performance, for example, can provide an indication of the efficacy of various training schemes in expanding small scale industry employment. Correspondingly, the results of the analysis of the relationship between capital and entrepreneurial success can provide insights into the potential effectiveness of credit

schemes that might be specifically designed for this sector. These examples, however, are only illustrative of the kinds of analyses that would provide useful insights for policy-makers.

It should be noted in conclusion, however, that the rural small scale industry study can also assist policy-makers simply by providing descriptive information about the extent and composition of this sector. To cite an example, the Sierra Leone Government recently received several large orders for gara cloth from a number of foreign countries, but has been unable to locate sufficient quantities of the materials to satisfy this demand. One of the reasons for the Government's difficulty in the area is that it does not know where most of the widely dispersed gara dyeing establishments are located. Thus, by providing this basic information, the project will be able to assist directly the Government in expanding employment opportunities in the rural small scale industrial sector of Sierra Leone.

Summary

The emprical evidence generated by the study has revealed that the small scale industrial sector in Sierra Leone is extensive, both in terms of the number of establishments and employment. The average size of these establishments is small, 1.9 workers per establishment, and the vast majority (95 percent) are located in the rural areas. Tailoring is by far the most important activity, followed by carpentry, gara dyeing and baking. The composition of activities varies importantly by location, thus reinforcing the importance of distinguishing between industries in the urban and rural areas. These initial results also illustrate the importance of including small scale industry in employment generation and rural development programs.

To obtain even more detailed information on the sector, however, a sample of 366 industrial establishments is being enumerated twice weekly for a period of one year. The data generated will be subjected to various statistical analyses to determine the key structural parameters of the rural small scale industrial sector and the intersectoral linkages that unite this sector with the other parts of the economy. As a result, the major determinants of the demand for labor in rural small scale industry will be identified and examined. The results generated by the study should thus prove to be of value to policy-makers charged with developing effective strategies and policies for employment generation and rural development in Sierra Leone as well as other African countries.

BIBLIOGRAPHY

Benjamin Spiro Associates. 1971. "The Development of African Enterprise in the Entente Countries," Report Prepared for United States Agency for International Development, Washington, D.C., December.

Callaway, A. 1967. "From Traditional Crafts to Modern Industries," The City of Ibadan: A Symposium on Its Structure and Development, edited by P. C. Lloyd, A. M. Mabogunje and B. Awe. Cambridge: Cambridge University Press and Ibadan, Nigeria: University of Ibadan.

Child, F. C. 1973. "An Empirical Study of Small-Scale Rural Industry in Kenya," IDS Working Paper No. 127, Institute of Development Studies, University of Nairobi, Nairobi, Kenya.

_____ and M. E. Kempe, eds. "Small Scale Enterprise: Proceedings of a Conference Held February 26 and 27, 1973," Occasional Paper No. 6, Institute of Development Studies, University of Nairobi, Nairobi, Kenya.

de Wilde, John. 1975. "India: Nonformal Education in the Development of Small Enterprise," Education for Rural Development, edited by Manzoor Ahmed and Philip H. Coombs. New York: Praeger Publishers.

Frank, C. R. 1968. "Urban Unemployment and Economic Growth in Africa," Oxford Economic Papers (July): 249-273.

Ghana, Government of. 1965. Area Sampling of Small Manufacturing Establishments, 1963. Accra, Ghana: Central Bureau of Statistics.

Industrial Research Unit. 1972. Small Scale Industries: Western State of Nigeria. Ile-Ife, Nigeria: Industrial Research Unit.

International Labour Office. 1972. "Socio-Economic Conditions in the Ifo, Otta and Ilaro Districts: Pilot Project for Rural Employment Promotion in the Western State," International Labour Office, Geneva, Switzerland.

Kilby, Peter. 1962. The Development of Small Industry in Eastern Nigeria. Lagos, Nigeria: United States Agency for International Development.

Langlois, J. W. 1969. "The Feasibility of a Regional Program to Encourage African Enterpreneurs in the Entente Countries," Consultants Report to the United States Agency for International Development, Washington, D.C.

Levi, John. 1974. "African Agriculture Misunderstood: Policy in Sierra Leone," Food Research Institute Studies, 13, 3: 239-262.

Liedholm, Carl. 1973. "Research on Employment in the Rural Nonfarm Sector in Africa," African Rural Employment Paper No. 5, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.

Minasian, Jora. 1961. "Elasticities of Substitution and Constant Output Demand Curves for Labor," Journal of Political Economy, 59, 3: 261-270.

Rosser, Colin. 1973. "Urbanization in Tropical Africa: A Demographic Introduction," Working Paper, International Urbanization Survey, Ford Foundation, New York, New York.

Schadler, Karl. 1968. Crafts, Small-Scale Industries and Industrial Education in Tanzania. Munchen, Germany: Weltform Verlag.

Sen, Amartya. 1975. Employment Technology and Development. London: Oxford.

Sierra Leone, Bank of. 1972. Economic Review, 7, 30 (December).

Sierra Leone, Government of. 1967. Customs and Excise Tariffs. Freetown: Government Printer.

_____. 1970. Report on the Survey of Business and Industry, 1966/67. Freetown: Central Statistics Office.

_____. 1971. Trade and Industry Bulletin: Republican Anniversary Issue. Freetown: Government Printer.

_____. 1972. Budget Speech, June 1972. Freetown: Government Printer.

_____. 1973. National Accounts of Sierra Leone, 1963/64 to 1971/72. Freetown: Central Statistics Office.

_____. 1974. National Development Plan, 1974/75 to 1978/79. Freetown: Government Printer.

Spencer, Dunstan. 1972. "Micro-Level Farm Management and Production Economics Research Among Traditional African Farmers: Lessons from Sierra Leone," African Rural Employment Paper No. 3, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.

Staley, Eugene and Richard Morse. 1965. Modern Small Scale Industry for Developing Countries. New York: McGraw-Hill Book Company.

Wallis, K. F. 1973. Topics in Applied Economics. London: Gray-Mills Publishing, Ltd.

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